

What is claimed is:

1 1. An optical communication system comprising an external cavity laser that
2 comprises:

3 ✓ a gain medium comprising an active region, a beam expanding region, *greater coupling eff.*
4 and an antireflective layer on a first surface of the gain medium;

5 *more efficient lasing* ✓ an optical waveguide located adjacent the gain medium such that at
6 least a portion of the electromagnetic energy generated by the active region
7 passes through the beam expanding region and through the antireflective
8 layer into the optical waveguide; and

9 ✓ a Bragg grating integral with or coupled to the optical waveguide,
10 ✓ wherein the medium and the optical waveguide exhibit a coupling
11 efficiency of at least 40% with or without the presence of coupling optics located
12 between the gain medium and the optical waveguide, and

13 wherein the laser is configured and operated to provide a multimode output of at
14 least two modes.

1 a 2. The system of claim 1, wherein the coupling efficiency is at least ^{50%}~~40%~~
2 with or without the presence of coupling optics located between the gain medium and the
3 optical waveguide.

1 3. The system of claim 1, wherein the gain medium comprises a cavity less
2 than 1 cm in length.

1 4. The system of claim 1, wherein the length of the system is less than 100
2 km.

1 5. The system of claim 1, wherein the laser is operated by direct modulation.

1 6. The system of claim 1, wherein the bit error rate of the system is less than
2 10^{-9} .

1 7. The system of claim 6, wherein the bit error rate of the system is less than
2 10^{-12} .

1 8. The system of claim 1, wherein the laser is operated at 2.5 GHz or greater.

1 9. The system of claim 1, wherein the laser is operated in the absence of a
2 temperature-compensating apparatus.

1 10. The system of claim 1, wherein the gain medium and optical waveguide
2 are coupled in the absence of coupling optics.

sub B3 11. An optical communication system comprising an external cavity laser that
2 comprises:

3 ✓ a gain medium comprising an active region, a beam expanding region,
4 and an antireflective layer on a first surface of the gain medium;

5 ✓ an optical waveguide located adjacent the gain medium such that at
6 least a portion of the electromagnetic energy generated by the active region
7 passes through the beam expanding region and through the antireflective
8 layer into the optical waveguide; and

9 ✓ a Bragg grating integral with or coupled to the optical waveguide,
10 wherein the medium and the optical waveguide exhibit a coupling
11 efficiency of at least 40% in the absence of coupling optics located
12 between the gain medium and the optical waveguide,

13 ✓ wherein the laser is configured and operated to provide a multimode output of at
14 least two modes,

15 ✓^{OK} wherein the laser is operated by direct modulation,

16 ✓^{OK} wherein the laser is operated in the absence of a temperature-compensating
17 apparatus,

18 ✓^{OK} wherein the gain medium comprises a cavity less than 1 cm in length, and

19 ✓^{OK} wherein the length of the system is less than 100 km.

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12. The system of claim 11, wherein the coupling efficiency is at least 40%
2 with or without the presence of coupling optics located between the gain medium and the
3 optical waveguide.

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13. The system of claim 11, wherein the bit error rate of the system is less than
2 10^{-9} .

14. The system of claim 13, wherein the bit error rate of the system is less than
2 10^{-12} .

15. The system of claim 13, wherein the laser is operated at 2.5 GHz or greater

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